

Evidence table: Procedural Pain Management: supporting children and their families through medical procedures

The Hierarchy of Evidence

The Hierarchy of evidence is based on summaries from the National Health and Medical Research Council (2009), the Oxford Centre for Evidence-based Medicine Levels of Evidence (2011) and Melynyk and Fineout-Overholt (2011).

- I Evidence obtained from a systematic review of all relevant randomised control trials.
- II Evidence obtained from at least one well designed randomised control trial.
- III Evidence obtained from well-designed controlled trials without randomisation.
- IV Evidence obtained from well designed cohort studies, case control studies, interrupted time series with a control group, historically controlled studies, interrupted time series without a control group or with case- series
- V Evidence obtained from systematic reviews of descriptive and qualitative studies
- VI Evidence obtained from single descriptive and qualitative studies
- VII Expert opinion from clinicians, authorities and/or reports of expert committees or based on physiology

Melynyk, B. & Fineout-Overholt, E. (2011). *Evidence-based practice in nursing & healthcare: A guide to best practice (2nd ed.)*. Philadelphia: Wolters Kluwer, Lippincott Williams & Wilkins.

National Health and Medical Research Council (2009). *NHMRC levels of evidence and grades for recommendations for developers of guidelines (2009)*. Australian Government: NHMRC. http://www.nhmrc.gov.au/files_nhmrc/file/guidelines/evidence_statement_form.pdf

OCEBM Levels of Evidence Working Group Oxford (2011). *The Oxford 2011 Levels of Evidence*. Oxford Centre for Evidence-Based Medicine. <http://www.cebm.net/index.aspx?o=1025>

Reference <i>(include title, author, journal title, year of publication, volume and issue, pages)</i>	Evidence level <i>(I-IV)</i>	Summary of recommendation from this reference
Australian Medicines Handbook (2016). Children's Dosing Companion (online). Adelaide, Australian Medicines Handbook Pty Ltd.	V	<ul style="list-style-type: none"> • Dosing guidelines and clinical considerations for Amethocaine and Emla. • Identifying adverse reactions and expected clinical response to topical anaesthesia
Birnie, K. A., et al. (2014). "Hospitalized children continue to report undertreated and preventable pain." <i>Pain research & management</i> 19(4): 198-204.	IV	<ul style="list-style-type: none"> • Cross sectional study of prevalence of clinically significant pain in paediatric inpatients • 94% of children experienced pain • Majority reported worst pain related to medical procedures
Birnie, K. A., et al. (2014). "Systematic review and meta-analysis of distraction and hypnosis for needle-related pain and distress in children and adolescents." <i>Journal of Pediatric Psychology</i> 39(8): 783-808.	I	<ul style="list-style-type: none"> • Systematic review of the evidence for distraction and hypnosis for needle-related pain and distress in children and adolescents. • Strong support for distraction and hypnosis for reducing pain and distress from needle procedures. • The quality of available evidence was low.
Blount, R. L., et al. (2006). "Pediatric procedural pain." <i>Behaviour Modification</i> 30(1): 24-49.	V	<ul style="list-style-type: none"> • Review of the types of procedural pain experienced for children in different medical settings. • Recommendations are made for pharmacological and non-pharmacological interventions for procedural pain
Boerner, K. E. B., et al. (2015). "Simple Psychological Interventions for Reducing Pain From Common Needle Procedures in Adults: Systematic Review of Randomized and Quasi-Randomized Controlled Trials." <i>Clinical Journal of Pain</i> 31 Supplement(10S): S90-S98.	I Adults	<ul style="list-style-type: none"> • Systematic review of the effectiveness of simple psychological interventions for managing procedural pain and distress for adults receiving needle procedures • Some benefit for breathing strategies and neutral signalling at the start of the procedure. • No evidence for use of music or visual distraction. • No evidence for vaccination pain
Boles, J. (2013). "Speaking up for children undergoing procedures: the ONE VOICE approach." <i>Pediatric Nursing</i> 39(5): 257-259.	VII	<ul style="list-style-type: none"> • The ONE VOICE philosophy recommends that health care professionals be aware of the clinical environment that children are exposed to during medical procedures.

<p>Chambers, C. T., et al. (2009). "Psychological interventions for reducing pain and distress during routine childhood immunizations: a systematic review." <i>Clinical Therapeutics</i> 31 Suppl 2: S77-S103.</p>	<p>I</p>	<ul style="list-style-type: none"> • Systematic review to determine the effectiveness of psychological interventions for reducing pain and distress in children during routine immunizations. • Breathing exercises, child-directed distraction, nurse-led distraction, and combined cognitive-behavioural interventions are effective in reducing the procedural pain and distress • Recommend that parents and health care professionals routinely incorporate psychological interventions in procedural pain management
<p>Cohen, L. L. (2008). "Behavioral approaches to anxiety and pain management for pediatric venous access." <i>Pediatrics</i> 122 Suppl 3: S134-139.</p>	<p>VII</p>	<ul style="list-style-type: none"> • Behavioral interventions should be implemented across each stage of the medical procedure • Preparing the child and the family for a medical procedure is an important behavioural intervention • Coaching coping skills is helpful for managing procedural distress.
<p>Czarnecki, M. L., et al. (2011). "Barriers to Pediatric Pain Management: A Nursing Perspective." <i>Pain Management Nursing</i> 12(3): 154-162.</p>	<p>VI</p>	<ul style="list-style-type: none"> • Survey of nursing barriers to optimal paediatric pain management. • Insufficient time to prepare children for medical procedures emerged as a key barrier to optimal pain management.
<p>Czarnecki, M. L., et al. (2011). "Procedural pain management: a position statement with clinical practice recommendations." <i>Pain Management Nursing</i> 12(2): 95-111.</p>	<p>VII</p>	<ul style="list-style-type: none"> • Position statement from American Society for Pain Management. • Recommendations for clinical management of procedural pain management and provision of comfort care to alleviate distress.
<p>Flowers, S. R. and K. A. Birnie (2015). "Procedural Preparation and Support as a Standard of Care in Pediatric Oncology." <i>Pediatric Blood & Cancer</i>(S5): 668.</p>	<p>I</p>	<ul style="list-style-type: none"> • Systematic review of psychological interventions for procedural pain management in paediatric oncology. • Distraction, combined cognitive-behavioral strategies, and hypnosis identified as effective interventions for reducing pain and distress
<p>Franck, L. S., et al. (2000). "Pain assessment in infants and children." <i>Pediatric Clinics of North America</i> 47(3): 487-512.</p>	<p>VII</p>	<ul style="list-style-type: none"> • Accurate assessment of paediatric pain reliant on multiple psychosocial and contextual factors

<p>Friedrichsdorf, S. (2014). "Reducing and eliminating procedural pain related to needles: the four essential (non-negotiable) components." Retrieved 8th of October, 2015, Australian Pain Society</p>	<p>VII</p>	<ul style="list-style-type: none"> • There are simple but effective interventions for procedural pain management that the author recommends be provided for children with every medical procedure
<p>Harrison, D., et al. (2012). "Sucrose for procedural pain management in infants." Pediatrics 130(5): 918-925.</p>	<p>VII</p>	<ul style="list-style-type: none"> • Review of current evidence for sucrose mediated analgesia in infants
<p>Harrison, D., et al. (2010). "Efficacy of sweet solutions for analgesia in infants between 1 and 12 months of age: a systematic review." Archives of Disease in Childhood 95(6): 406-413.</p>	<p>I</p>	<ul style="list-style-type: none"> • Systematic review of the efficacy of sweet tasting solutions for the management of procedural pain in infants (1-12months age). • Sucrose or glucose administered prior to immunisation had moderately reduced incidence and duration of crying for infants aged 1-12 months.
<p>Harrison, D., et al. (2011). "Sweet tasting solutions for reduction of needle-related procedural pain in children aged one to 16 years." Cochrane Database Syst Rev(10): CD008408.</p>	<p>I</p>	<ul style="list-style-type: none"> • Systematic review of the efficacy of sweet tasting solutions for the management of procedural pain in children (1-16 years). • Of the 4 studies identified there is insufficient evidence for the analgesic effect of sucrose or sweet tasting solutions in procedural pain management for children ≥ 1 year of age.
<p>Jaaniste, T., et al. (2007). "Providing Children With Information About Forthcoming Medical Procedures: A Review and Synthesis." Clinical Psychology: Science and Practice(2): 124.</p>	<p>VII</p>	<ul style="list-style-type: none"> • Overview of the theories of providing information about medical procedures to children and their families.
<p>Johnston, C., et al. (2014). "Skin-to-skin care for procedural pain in neonates." Cochrane Database Syst Rev 1: CD008435.</p>	<p>I</p>	<ul style="list-style-type: none"> • Systematic review of the effectiveness of skin to skin care (SSC) on procedural pain for neonates compared to (1) no intervention, (2) sucrose and (3) rocking • According to composite pain measures SSC appears to be effective and safe for single medical procedures ie. Heel lance.
<p>Kleiber, C., et al. (2007). "Development of the Distraction Coaching Index." Children's Health Care 36(3): 219-235 217p.</p>	<p>VI</p>	<ul style="list-style-type: none"> • Describes the development of the Distraction Coaching Index (DCI) for procedural pain • The DCI is recommended for the evaluation of distraction coaching by health professionals and parents

Kurdahi Badr, L. (2012). "Pain Interventions in Premature Infants." <i>Newborn and Infant Nursing Reviews</i> 12(3): 141-153.	VII	<ul style="list-style-type: none"> • Nurses should limit the use of painful procedures. If necessary, then adequate planning and preparation are required to provide appropriate procedural pain management interventions • Analgesics are recommended for procedures considered to cause severe pain • Nurses should apply the principles of minimal handling and limited noxious stimuli during medical procedures.
Lander, J. A. (2014). "EMLA and Amethocaine for reduction of children's pain associated with needle insertion." <i>Cochrane Database of Systematic Reviews</i> (3).	I	<ul style="list-style-type: none"> • A systematic review comparing Amethocaine and an eutectic mixture of local anaesthetics (EMLA) for intravenous cannulation and venipuncture in children in regards to (1) anaesthetic efficacy, (2) ease of needle insertion and (3) adverse events • EMLA is an effective topical anaesthetic for children. • Amethocaine is superior in preventing pain associated with needle procedures.
Maclaren, J. E. and L. L. Cohen (2007). "Interventions for paediatric procedure-related pain in primary care." <i>Paediatrics & Child Health</i> 12(2): 111-116.	VII	<ul style="list-style-type: none"> • Overview of pharmacological and non-pharmacological interventions for managing procedural pain and distress in children.
McCarthy, M., et al. (2013). "Comfort First: an evaluation of a procedural pain management programme for children with cancer." <i>Psycho-Oncology</i> 22(4): 775-782.	IV	<ul style="list-style-type: none"> • Single site cross-sectional audit evaluating a procedural pain program in paediatric oncology • Non-pharmacological support was frequently used • Younger age was a significant predictor of procedural distress
McMurtry, C. M., et al. (2010). "When "don't worry" communicates fear: Children's perceptions of parental reassurance and distraction during a painful medical procedure." <i>Pain</i> (03043959) 150(1): 52-58.	III	<ul style="list-style-type: none"> • Investigation of how children perceive parental levels of fear when reassured during a medical procedure. • Children reported higher levels of fear during reassurance than distraction
Mesibov, G. B., et al. (2002). "Using Individualized Schedules as a Component of Positive Behavioral Support for Students with Developmental Disabilities." <i>JOURNAL OF POSITIVE BEHAVIOR INTERVENTIONS</i> 4: 73-79.	VII	<ul style="list-style-type: none"> • Review of research supporting the use of individualized schedules as a behavioural intervention for children.

Noel, M., et al. (2012). "The influence of children's pain memories on subsequent pain experience." <i>Pain</i> 153(8): 1563-1572.	IV	<ul style="list-style-type: none"> • Prospective cohort study investigating the influence of children's memory of pain on subsequent pain experiences. • Children with negative pain memories had expectations for greater pain prior to a subsequent pain experience than children who had positive pain memories
O'Brien, L., et al. (2005). "A Critical Review of the Topical Local Anesthetic Amethocaine (Ametop™) for Pediatric Pain." <i>Pediatric Drugs</i> 7(1): 41-54.	VII	<ul style="list-style-type: none"> • Critical review of the literature on Amethocaine and recommendations for clinical practice. • The rapid onset of action and prolonged duration of action may result in Amethocaine more useful than EMLA in clinical settings.
Pillai Riddell, R., et al. (2011). "Nonpharmacological management of procedural pain in infants and young children: an abridged Cochrane review." <i>Pain research & management</i> 16(5): 321-330.	I	<ul style="list-style-type: none"> • To assess the efficacy of nonpharmacological interventions for acute procedural pain in children up to three years of age. • Sufficient evidence to support nonpharmacological interventions in infants and healthy neonates there was limited evidence to support these interventions with older infants and young children
Pillai Riddell, R. P., et al. (2015). "Psychological Interventions for Vaccine Injections in Young Children 0 to 3 Years: Systematic Review of Randomized Controlled Trials and Quasi-Randomized Controlled Trials." <i>Clinical Journal of Pain</i> 31 Supplement (10S): S64-S71.	I	
Pillai Riddell, R. R., et al. (2011). "Non-pharmacological management of infant and young child procedural pain." <i>Cochrane Database Syst Rev</i> (10): CD006275.		<ul style="list-style-type: none"> • Authors examined 13 different types of commonly investigated non-pharmacological treatments (excluding breastmilk, sucrose, and music) to determine their efficacy for reducing pain after a medical procedure. • There was sufficient evidence for preterm infants to recommend kangaroo care, sucking-related interventions, and swaddling/facilitated tucking interventions. • For neonates, there was sufficient evidence to recommend sucking-related interventions for procedural pain management
Schechter, N. L., et al. (2007). "Pain reduction during pediatric immunizations: evidence-	VII	<ul style="list-style-type: none"> • Panel convened of clinicians experienced in procedural pain

based review and recommendations." Pediatrics 119(5): e1184-1198.		<ul style="list-style-type: none"> • Recommendations for management of immunisation pain from the panel based on current literature
Shah, P. S., et al. (2012). "Breastfeeding or breast milk for procedural pain in neonates." Cochrane Database Syst Rev 12: CD004950.	I	<ul style="list-style-type: none"> • Evaluation of the effectiveness of breastfeeding in reducing procedural pain in neonates. • Breastfeeding or breast milk should be used for procedural pain management in neonates undergoing single procedures.
Spence, K., et al. (2010). "Evidenced-based clinical practice guideline for management of newborn pain." Journal of Paediatrics and Child Health 46(4): 184-192.	IV	<ul style="list-style-type: none"> • Cross sectional audit of newborn pain management against best practice guideline • Clinical practice guideline for managing newborn pain applicable to a variety of clinical settings
Stevens, B. J., et al. (2011). "Epidemiology and management of painful procedures in children in Canadian hospitals." CMAJ: Canadian Medical Association Journal 183(7): E403-410 401p.	IV	<ul style="list-style-type: none"> • Large multi-site retrospective audit of painful procedures performed and pain management interventions in a 24-hour period for paediatric inpatients • Medical procedures were common and frequent with a mean of 6 procedures per child in a 24 hour period
Taddio, A., et al. (2015). "Reducing pain during vaccine injections: clinical practice guideline." Canadian Medical Association Journal.	I	<ul style="list-style-type: none"> • Systematic review of procedural pain interventions to form a clinical practice guideline for managing vaccination pain • Breast feeding recommended for children ≤ 2years. • Children should be sat upright during medical procedures where feasible. • Topical anaesthesia should be applied before vaccinations.
Taddio, A. B. M. P., et al. (2015). "Procedural and Physical Interventions for Vaccine Injections: Systematic Review of Randomized Controlled Trials and Quasi-Randomized Controlled Trials." Clinical Journal of Pain 31 Supplement(10S): S20-S37.	I	<ul style="list-style-type: none"> • Systematic review of the effectiveness of physical and procedural interventions for reducing pain and related outcomes during vaccination. • Evidence for interventions that reduce procedural pain and distress in infants and children include: avoiding aspiration, injecting most painful vaccine last, using simultaneous injections, positioning for comfort, non-nutritive sucking, and external vibrating device with cold.
The Royal Australasian College of Physicians (2005). Guideline Statement: Management of Procedure-related Pain in Children and	VII	<ul style="list-style-type: none"> • Position statement for health professionals wanting to better manage procedure-related pain and distress in children. • Recommendations for the management of infants, children and

Adolescents. P. C. H. Division. Sydney, The Royal Australasian College of Physicians		adolescents who are at risk of acute pain distress related to medical procedures.
Twycross, A., et al. (2009). Managing pain in children: a clinical guide. United Kingdom, Wiley-Blackwell.	VII	<ul style="list-style-type: none"> • Book outlining the anatomy and physiology of pain in children and the evidence based management of acute pain.
Yaster, M. (2010). "Multimodal analgesia in children." European Journal of Anaesthesiology (EJA) 27(10): 851-857 810.1097/EJA.1090b1013e328338c328334af.	VII	<ul style="list-style-type: none"> • Outlines a multimodal approach to paediatric pain management that incorporates non-pharmacological pain management strategies.
Young, K. (2005). "Pediatric Procedural Pain." Annals of Emergency Medicine 45(2): 160-171.	VII	<ul style="list-style-type: none"> • Review of the evidence for the long-term negative effects of poorly managed procedural pain and tools to assess pain in children.